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MEASURED RESULTS OF SUPERVISED STUDY, II*

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Results based on strictly comparable groups.—The general method of procedure in the present experiment, as previously stated, was the method of comparable groups. These groups were arranged by principals and teachers in accord with the general directions for the experiment, which prescribed certain uniformities. In the practical school situations that had to be met, however, compromises were sometimes necessary. As a matter of fact, some of the paired groups arranged under these conditions are comparable only by a sort of courtesy. Lack of uniformity was most noticeable in respect to the initial ability of paired classes. Even between compared continuous groups the variation was sufficiently marked to justify a comparison of results upon the basis of more strictly comparable groups. A glance at Table I, for example, to cite an extreme case, will show that the continuous groups in School III had preliminary percentages of 39.7 and 57.6. School VIII exhibited an initial large difference between the two groups, the preliminary percentages being 72.3 and 81.6. While these two are the most striking cases among the algebra classes, there are other pairs that differ by small amounts. It was feared that this variation, though on the average small, might be attended by a corresponding variation in the amount of the improvement percentage, on the principle that equal percentages of improvement do not represent equal amounts of improvement when the opportunity for improvement varies, or, otherwise expressed, when the improvement percentages are measured from different points on a common scale of achievement. Furthermore, comparison based upon a central tendency only does not seem so reliable as a comparison that rests, in addition, upon equal degrees of variability in the two groups.

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*Continued from School Review of March 1919, p. 204.

In view of these considerations it was decided to select more strictly comparable groups from the classes and compare the progress of these groups. In other words, this question was asked: What are the relative effects of supervision and non-supervision on two groups of exactly the same size, matched individually in ability, equal therefore in average ability, taught by the same teacher, belonging to classes of approximately equal enrolment, made up of pupils present at every test, and so on through the list of other uniformities?

In order to facilitate the selection of these more strictly comparable groups, the names of the pupils of all compared classes were arranged in parallel columns according to magnitude of preliminary scores and horizontally according to group intervals of 10 per cent. The same number of pupils was selected from each group interval in both classes in such a way that average scores for the group interval and individual scores in the group interval were as nearly as possible the same in both classes.

A fairly typical outcome of the method of selection just described is shown in Table IV, which is for two algebra classes in High School VIII during the period from the preliminary to the semifinal test.

Each score in the columns for the preliminary test represents the average score of the individuals selected in the group interval. It will be noted that in these two comparable groups of ten each the average preliminary scores differ by 0.2 per cent. In no case in the groups thus arranged did the difference between the average scores amount to more than a small fraction of 1 per cent.

In Table V are presented the results for the strictly comparable groups in the twenty algebra classes. Except for the arrangement of comparable groups, the method of tabulating the results was precisely the same as that used in Table I.[1] Here, as in Table I, of the ten classes that had supervised study, five showed greater gains than their comparable unsupervised classes and five showed smaller gains. The average amount of improvement was 1.2 per cent greater for unsupervised study. When computation was made of the improvement up to the semifinal test of those groups that later continued to the final test, it was found that four of the seven supervised classes made greater relative gains than the compared unsupervised classes, and that these four supervised classes showed a greater relative gain of 1 per cent. The results, after the methods of study were reversed, are shown in the lowest section of the table. Only one of the seven classes

TABLE IV

PERCENTAGE SCORES OF TWO STRICTLY COMPARABLE GROUPS SELECTED FROM ALGEBRA CLASSES IN HIGH SCHOOL VIII

GROUP INTERVALS	SUPERVISED					UNSUPERVISED				
	Frequency	Preliminary	Teacher's Semifinal	Laboratory Semifinal	Combined Semifinal	Frequency	Preliminary	Teacher's Semifinal	Laboratory Semifinal	Combined Semifinal
41–50	1	50	45.2	73	59.1	1	50	28.6	54	41.3
51–60	3	59	61.0	76	68.5	3	60	54.7	79	66.9
61–70	1	70	45.2	73	59.1	1	70	52.4	70	61.2
71–80	2	80	51.4	73	62.3	2	80	36.9	63.5	50.3
81–90	1	90	57.1	82	69.6	1	90	57.1	72	64.6
91–100	2	98	58.3	79	68.7	2	97.5	73.8	86	79.9
Average	....	74.3	54.9	76	65.5	....	74.5	52.4	73.2	62.8

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[1] School Review, March, 1919, p. 201.

TABLE V

PERCENTAGE OF EXCESS OF IMPROVEMENT IN COMPARABLE GROUPS UNDER SUPERVISED AND UNSUPERVISED STUDY IN FIRST-YEAR ALGEBRA

CHARACTER OF CLASS DATA	HIGH SCHOOL										Av.	HIGH SCHOOL										Av.
	II	III	IV	VII	VIII	IX	X	XI	XII	XIII		II	III	IV	VII	VIII	IX	X	XI	XII	XIII	
Enrolment	24	15	11	23	19	17	12	18	19	17	17.5	24	15	13	21	16	15	12	21	24	21	18.2
Frequency	12	9	8	16	10	10	5	8	17	8	10.3	12	9	8	16	10	10	5	8	17	8	10.3
Preliminary score	71.9	44.3	82.8	87.2	74.3	88.8	49.8	82.8	83.1	53.0	71.8	71.8	44.6	83.2	87.3	74.5	88.6	49.6	82.8	83.4	52.7	71.9
Excess of Improvement	Supervised					Preliminary to Semifinal (A)											Unsupervised					
By teacher's scores	....	....	11.0	1.3	2.7	....	....	6.7	....	15.8	3.1	5.9	16.4	....	....	....	5.6	2.7	....	3.7	....	3.4
By laboratory scores	....	....	7.7	0.7	3.0	....	....	2.7	....	14.9	2.4	6.0	15.2	....	....	....	3.5	6.4	....	8.2	....	4.0
By combined scores	....	....	9.3	4.1	2.9	....	....	4.7	....	15.4	3.2	6.0	15.7	....	....	....	4.6	4.6	....	10.1	....	4.4
Av. net excess	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**1.2**
	Supervised					Preliminary to Semifinal (B)											Unsupervised					
By teacher's scores	....	....	11.0	1.3	....	....	....	6.7	....	15.8	4.4	5.9	16.4	....	....	....	....	2.7	....	....	....	3.5
By laboratory scores	....	....	7.7	0.7	....	....	....	2.7	....	14.9	3.2	6.0	15.2	....	....	....	....	6.4	....	....	....	3.6
By combined scores	....	....	9.3	4.1	....	....	....	4.7	....	15.4	4.6	6.0	15.7	....	....	....	....	4.6	....	....	....	3.6
Av. net excess	....	....	....	....	....	....	....	....	....	....	**1.0**	....	....	....	....	....	....	....	....	....	....	....
	Unsupervised					Semifinal to Final											Supervised					
By teacher's scores	7.4	....	8.3	3.9	....	....	7.8	5.0	....	6.6	5.3	....	4.4	....	....	....	....	....	....	....	....	0.6
By laboratory scores	6.6	....	11.8	2.4	....	....	....	....	....	6.0	3.9	....	6.3	....	....	....	....	1.6	3.2	....	....	1.4
By combined scores	7.0	10.1	3.1	....	....	3.1	0.9	....	6.3	4.4	....	5.4	....	....	....	....	....	....	....	....	....	0.7
Av. net excess	....	....	....	....	....	....	....	....	....	....	**3.7**	....	....	....	....	....	....	....	....	....	....	....

TABLE VI

Percentage of Excess of Improvement in Comparable Groups under Supervised and Unsupervised Study in First-Year Latin

Character of Class Data	HIGH SCHOOL			Av.	HIGH SCHOOL			Av.
	I	IX	X		I	IX	X	
Enrolment	13	19	17	16.3	13	15	17	15
Frequency	9	10	9	9.3	9	10	9	9.3
Preliminary score	89.1	89.3	72.8	83.7	89.1	88.5	73.3	83.6
Excess of Improvement	Preliminary to Semifinal (A)							
	Supervised				Unsupervised			
By teacher's scores	4.6	13.1	11.8	10.0	....	....	....	0.0
By laboratory scores	....	15.7	3.2	6.6	5.0	....	....	1.6
By combined scores	....	14.4	7.6	7.6	0.2	....	....	0.1
Av. net excess	....	....	....	**7.5**	....	....	....	....
	Preliminary to Semifinal (B)							
	Supervised				Unsupervised			
By teacher's scores	4.6	....	11.8	8.2	....	....	....	0.0
By laboratory scores	....	....	3.2	1.6	5.0	....	....	2.5
By combined scores	....	....	7.6	3.8	0.2	....	....	0.1
Av. net excess	....	....	....	**3.7**	....	....	....	....
	Semifinal to Final							
	Unsupervised				Supervised			
By teacher's scores	....	....	0.4	0.2	1.6	....	....	0.8
By laboratory scores	....	....	....	0.0	4.2	....	1.5	2.9
By combined scores	....	....	....	0.0	2.9	....	0.5	1.7
Av. net excess	....	....	....	....	....	....	....	**1.7**

TABLE VII

Percentage of Excess of Improvement in Comparable Groups under Supervised and Unsupervised Study in Ninth-Grade English Composition

Character of Class Data	HIGH SCHOOL			Av.	HIGH SCHOOL			Av.
	II	V	XIV		II	V	XIV	
Enrolment	19	17	16	17.3	23	20	16	19.7
Frequency	18	9	9	12.0	18	9	9	12.0
Preliminary score	86.1	68.1	83.6	79.3	86.1	67.7	83.6	79.1
Excess of Improvement	Preliminary to Semifinal (A)							
	Supervised				Unsupervised			
By teacher's scores	....	....	1.6	0.4	2.6	7.1	....	3.1
By laboratory scores	....	....	1.9	0.5	0.4	11.7	....	3.1
By combined scores	....	....	1.7	0.4	1.5	9.4	....	3.1
Av. net excess	....	....	....	....	....	....	....	**2.7**
	Preliminary to Semifinal (B)							
	Supervised				Unsupervised			
By teacher's scores	....	....	1.6	0.8	....	7.1	....	3.6
By laboratory scores	....	....	1.9	1.0	....	11.7	....	5.9
By combined scores	....	....	1.7	0.9	....	9.4	....	4.7
Av. net excess	....	....	....	....	....	....	....	**3.8**
	Semifinal to Final							
	Unsupervised				Supervised			
By teacher's scores	....	2.9	1.3	2.1	....	....	....	0.0
By laboratory scores	....	2.5	2.5	2.5	....	....	....	0.0
By combined scores	....	2.7	1.9	2.3	....	....	....	0.0
Av. net excess	....	....	....	**2.3**	....	....	....	....

having supervised study during the second period of the experiment showed a greater relative gain than its paired unsupervised class. The unsupervised classes exhibited a net excess improvement of 3.7 per cent.

Turning now to the treatment of results in the Latin classes by the method of strictly comparable groups, Table VI, one notes that of the three classes having supervised study, two, according to the combined scores, showed greater relative improvement over the corresponding unsupervised classes to the extent of 14.4 and 7.6 per cent, respectively. In the other pair of classes the unsupervised class appears to have improved the more. After the methods were reversed, the advantage persisted on the side of supervised study in both pairs of classes that continued through the final test. The net excess improvement for the supervised classes in the final test reached 1.7, despite the fact that the classes which exhibited this gain began the last period of the experiment 3.7 per cent behind the classes with which they were compared.

In English composition, as shown in Table VII, only one of the three groups having supervised study showed a gain over its corresponding unsupervised group. The average net excess of improvement in these groups was in favor of unsupervised study by 2.7 per cent. Two of the three groups supervised in the first period of the experiment continued with their corresponding groups to the final test. In the semifinal test one of these two supervised classes showed a result in favor of supervised study, the other in favor of unsupervised study. The percentage of excess improvement was on the side of unsupervised study to the amount of 3.8 per cent. This advantage was lost after supervised study superseded unsupervised, both unsupervised classes showing greater improvement than the supervised classes to the average amount of 2.3 per cent.

Results from poor and good pupils.—In the review of previous investigations it was observed that the results from one of these investigations indicated a loss to bright pupils through supervised study. This indication is fraught with so much importance for the future organization of supervised study that it seemed advisable to examine the data for the first period of the present investigation from the standpoint of improvement of poor and good pupils. Accordingly, the individual scores of all strictly comparable groups, after being arranged in order of magnitude, were divided into two groups at the median. If the number of scores in the original group happened to be odd, the median score was omitted. Thus were obtained from each class two groups which will be termed the poor and the good. Table VIII illustrates the method of dividing the classes into such groups and the manner of tabulating the data for each pair of classes. In this illustrative tabulation it will be seen that there are eight pupils in each of the poor groups, and a like number in each of the good groups. Of the two poor groups, the one under supervised study has a preliminary average of 78.6 per cent; the other, unsupervised, an average of 79.3 per cent. In the same order the preliminary averages for the good groups are 87.8 and 87.5 per cent. Each of the poor groups, it will be noticed, was matched by this plan with another group of equal ability and numbers under the same teacher; likewise each good group.

Table IX is a summary of the preceding form of tabulation, showing the progress of the poor and good groups under supervision and non-supervision in all classes and subjects. The plan of comparison should become clearer by a reference to the table. In School II, for example, in algebra, there were six pupils in the poor supervised group, six in the poor unsupervised group, six in the good supervised group, and six in the good unsupervised group. The frequency figures in the second column apply to each of the four groups represented horizontally in the table. The table includes similarly arranged results for English composition and Latin, based on the work, in all three subjects, of 320 pupils.

TABLE VIII

The Method of Dividing Classes into and Tabulating Data for Poor and Good Groups; Results for Algebra in School XII

Supervised Class					Unsupervised Class				
Names of Pupils	Preliminary Score	Semifinal Scores			Names of Pupils	Preliminary Score	Semifinal Scores		
		Teacher's	Laboratory	Combined			Teacher's	Laboratory	Combined
	Poor Group					Poor Group			
H. B.	75	50	71	60.5	M. C.	76	83	98	90.5
M. B.	77	45	76	60.5	R. J.	77	83	94	88.5
A. M.	77	66	66	66	A. B.	78	94	97	95.5
L. K.	78	83	79	81	R. F.	78	83	94	88.5
M. H.	79	66	79	72.5	H. R.	80	62	81	71.5
B. L.	79	66	66	66	R. T.	80	83	96	89.5
C. H.	82	83	83	83	E. H.	82	79	80	79.5
J. R.	82	33	58	45.5	M. B.	83	95	97	96
Av.	78.6	....	....	66.9	Av.	79.3	....	....	87.4
	Good Group					Good Group			
A. W.	83	83	96	89.5	E. J.	85	95	99	97
E. N.	84	70	74	72	M. J.	85	100	100	100
G. A.	85	79	99	89	A. M.	85	79	95	87
R. K.	86	79	99	89	A. M.	85	79	99	89
C. D.	89	83	99	91	E. H.	86	50	60	55
M. S.	89	66	96	81	I. A.	88	95	99	97
E. B.	90	83	98	90.5	W. B.	90	95	99	97
M. A.	96	83	98	90.5	W. F.	96	83	94	88.5
Av.	87.8	....	....	86.6	Av.	87.5	....	....	88.8

In the columns of "Gain or Loss," superiority for supervised study is indicated by a plus percentage, inferiority by a minus percentage. In algebra, it will be noted, in six of the ten pairs of poor groups, supervised study was superior, with a net superiority among the poor pupils of about 1 per cent. Consulting the data for algebra in the right half of the table, one observes that supervised study showed superiority in four of the ten pairs of good groups, with an average inferiority

TABLE IX

COMPARATIVE PERCENTAGES OF IMPROVEMENT, UNDER SUPERVISED STUDY, OF POOR AND GOOD PUPILS IN THREE SUBJECTS

SCHOOL	FREQUENCY	POOR					GOOD				
		Supervised		Unsupervised		Gain or Loss	Supervised		Unsupervised		Gain or Loss
		Preliminary	Semifinal	Preliminary	Semifinal		Preliminary	Semifinal	Preliminary	Semifinal	
FIRST-YEAR ALGEBRA											
II........	6	58.0	38.6	57.5	42.8	− 4.7	85.7	54.2	86.0	61.4	− 6.9
III........	4	30.8	27.4	31.3	47.0	−19.1	57.0	54.4	56.8	69.3	−15.1
IV........	4	78.5	77.2	79.3	61.9	+16.1	87.0	84.7	87.3	82.0	+ 3.0
VII........	8	80.5	71.6	80.3	63.3	+ 8.1	94.0	91.9	94.3	92.1	+ 0.1
VIII........	5	59.8	64.8	60.0	60.6	+ 4.4	89.2	66.3	89.0	65.0	+11.1
IX........	5	85.4	75.8	85.0	71.1	+ 4.3	92.2	72.6	92.2	86.0	−13.4
X........	2	27.5	16.8	26.5	27.5	−11.7	76.0	71.0	76.0	98.8	−27.8
XI........	4	75.8	77.3	76.3	61.6	+16.2	89.8	65.5	89.3	71.8	− 6.8
XII........	8	78.6	66.9	79.3	87.4	−19.8	87.8	86.6	87.5	88.8	− 2.5
XIII........	4	38.0	76.8	37.8	52.8	+23.8	68.0	85.6	67.5	78.3	+ 6.8
Total.....	50	Average.....				+0.93					− 4.5
FIRST-YEAR LATIN											
I..........	4	81.0	85.4	82.0	87.4	− 1.0	94.8	78.3	95.3	94.0	−15.2
IX..........	5	85.4	81.7	84.4	58.0	+22.7	93.2	90.0	92.6	83.2	+ 6.2
X..........	4	57.0	29.4	62.0	25.3	+ 9.1	88.0	69.6	85.3	62.0	+ 4.9
Total.....	13	Average.....				+11.2					−10.2
NINTH-GRADE ENGLISH COMPOSITION											
II........	9	80.8	75.8	80.8	78.7	− 2.9	91.4	84.4	91.4	84.3	+ 0.1
V........	4	55.0	72.1	55.0	75.6	− 3.5	79.5	73.1	78.8	88.1	−15.7
XIV........	4	71.3	83.7	71.3	81.3	+ 2.4	93.8	91.1	93.8	86.7	+ 4.4
Total.....	17	Average.....				− 1.8					− 2.6

of 4.5 per cent. A similar analysis of the results in the Latin groups shows a gain for the poor groups, through supervised study, of 11.2 per cent, and a loss for the good groups of 10.2 per cent. In the English composition classes supervised study seems to have occasioned loss to both the poor and the good pupils, but more loss to the good than to the poor. The loss of the former was 2.6 per cent; of the latter, 1.8 per cent. The results are represented graphically in Fig. 1.

Results from a test by Plan II.—High School VI succeeded in arranging conditions satisfactorily and conducting the experiment under Plan II. The two classes used had enrolments of 16 and 18, and preliminary scores of 80.8 and 69.3, respectively. In the semifinal test the supervised class showed a superiority of 5.7 per cent when the results were averaged by continuous groups. Continuing with supervised study from the semifinal to the final test, after the teachers of the two classes had been exchanged, this class showed a gain, computed from the preliminary score, of 3.7 per cent; in other words, a loss of 2 per cent in the second period of study supervision. When the improvement was studied more accurately in strictly comparable groups, it was found that the supervised class showed a gain of 7 per cent at the semifinal and a loss of 2.1 per cent at the final test; in other words, a total decline, after the exchange of teachers, of 9.1 per cent. By each method of computing the results there was shown a decline in efficiency with change of teachers, indicating the importance of carefully controlling this variable.

From the preliminary to the semifinal test the poor students in these two classes gained 12.3 per cent more by supervised than by unsupervised study, while the good students lost 0.9 per cent, which is taken as additional evidence in confirmation of the finding above regarding the results of supervised study with superior and inferior pupils.

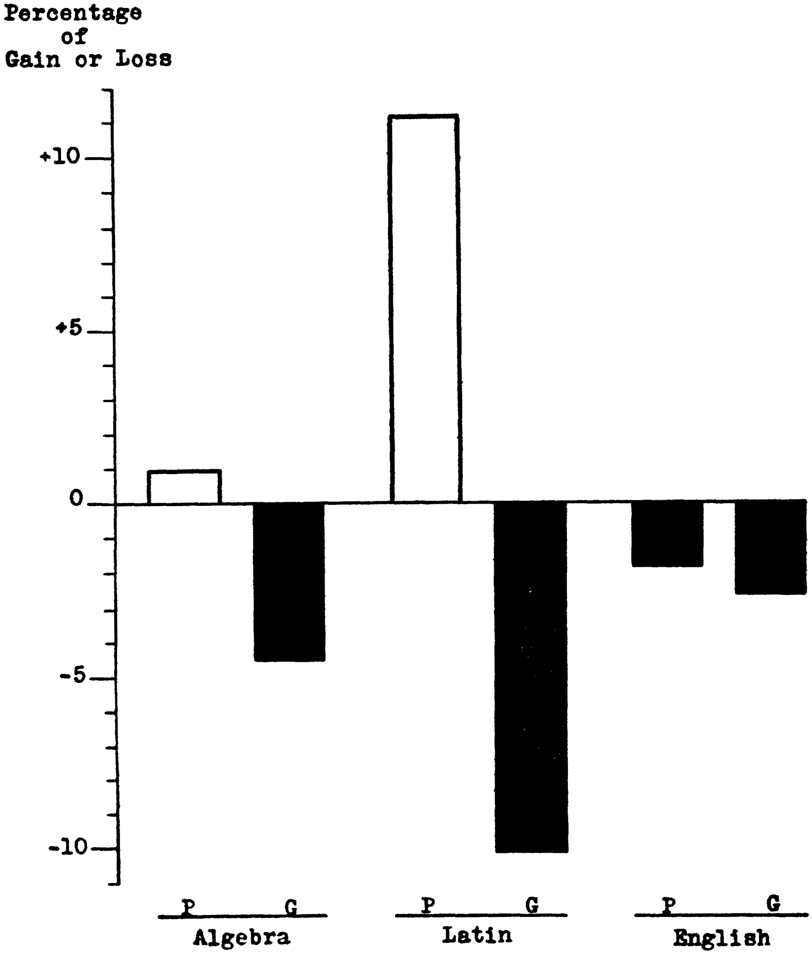

FIG. 1.—Comparative percentages of gain or loss of poor and good pupils under supervised study. The letters *P* and *G* refer to the two classes of pupils. Data in Table IX.

TABLE X

SUMMARY OF AVERAGE GAINS AND LOSSES PER PUPIL, IN PERCENTAGE, CONTINUOUS AND COMPARABLE GROUPS UNDER SUPERVISED STUDY

Subject	No. of Pairs of Classes	Percentage of Gain or Loss	
		Preliminary to Semifinal	Semi Final to final
CONTINUOUS GROUPS			
Algebra	7	−0.2	−5.3
Latin	2	+9.0	+7.1
English	2	−4.4	−3.9
COMPARABLE GROUPS			
Algebra	7	+1.0	+2.7
Latin	2	+3.7	+5.4
English	2	−3.8	−6.1

DISCUSSION OF RESULTS

Results in terms of average improvement of continuous and strictly comparable groups.—The discussion of the foregoing results may be clarified and abbreviated if it be permitted to take as its point of departure a condensed summary of the average gains and losses of supervised study, based separately on the continuous and strictly comparable groups previously described. A summary of this sort is provided in Table X. The improvement percentages, it will be noticed, are all in terms of supervised study and each represents loss or gain in a particular subject for a particular period.

Since the computations based on comparable groups seem somewhat more reliable than those based on continuous groups, interpretations based on these comparable-group percentages will probably be more secure. Losses and gains by the two methods, however, correspond in kind at every point except one. According to the comparable-group values, supervised study in algebra showed a relative gain of 1 per cent during the first period of the experiment, and a relative loss of 2.7 per cent during the second period, a loss noticeably greater in amount than the earlier gain. The results for continuous groups are represented graphically in Fig. 2, and for strictly comparable groups in Fig. 3.

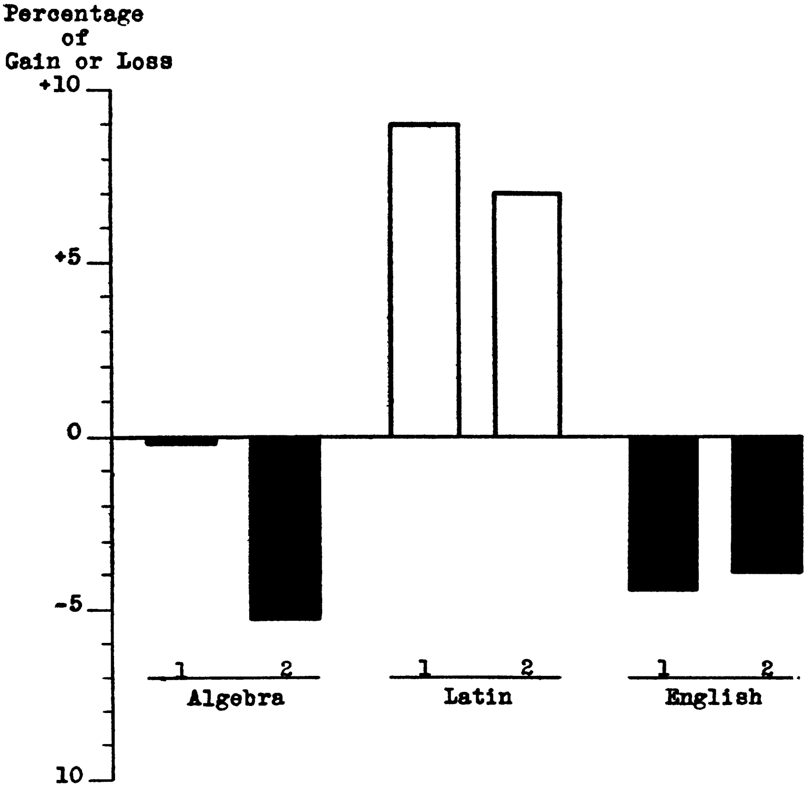

Fig. 2.—Average percentage per pupil of gain or loss under supervised study based on continuous groups. Numbers 1 and 2 refer to the first and second periods of the experiment. Data in Table X.

This is precisely what Breslich found when he reversed the methods in his sections and continued his study for six lessons. There was a slight gain for the section that had supervised study during the first period, and a considerable loss for the section that had it during the second period. Breslich

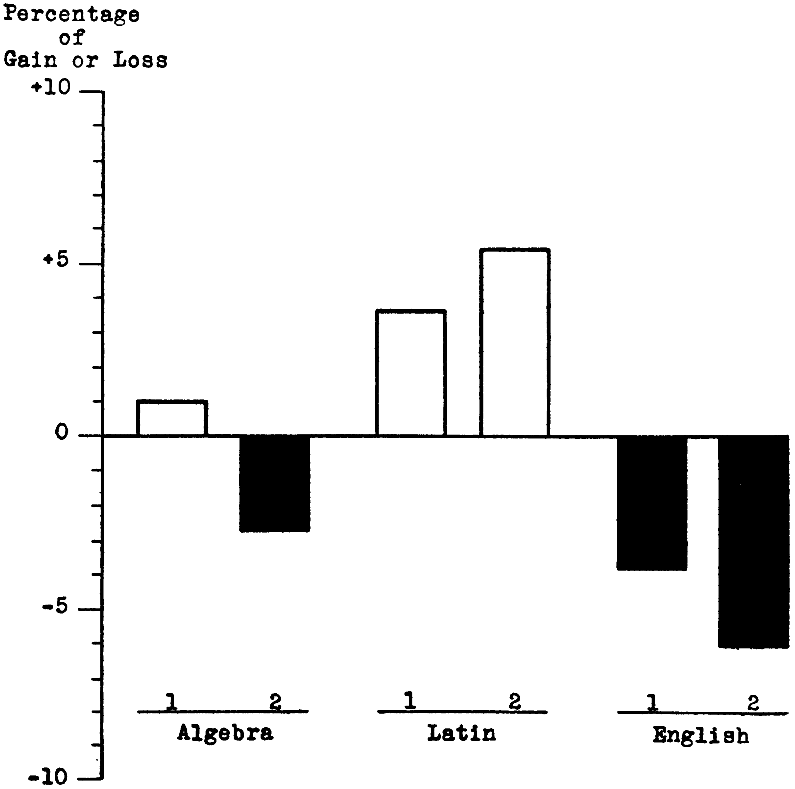

FIG. 3.—Average percentage per pupil of gain or loss under supervised study based on comparable groups. Numbers 1 and 2 refer to the first and second periods of the experiment. Data in Table X.

expressed the opinion that the power gained by the supervised section during the first period persisted and was strong enough to be thus helpful in the following period. Inasmuch as the second period in his experiment was not quite half so long as the first, thus conceivably giving the persistence effect an opportunity to operate near its maximum before the effect of supervision had reached a maximum in the other section, this interpretation may be the correct one. It would be unsafe, however, for teachers to generalize this conclusion. The facts provided in Table X may easily become the basis for a different interpretation. Comparing the improvement percentages for the two periods of the experiment by both methods of computation in all subjects, one finds it to be the rule rather than the exception that if supervised study gained in the first period, it gained also in the second; if it lost in the first period, it lost also in the second.

In the opinion of the writer it seems more consistent with the facts of this experiment to attribute the gains and losses of the second period to the effects of the immediate application of methods rather than to the "persistence" of effects of remote applications. For, note the results bearing on this point in subjects other than algebra. In the Latin classes there was a marked gain for supervised study during both periods of the experiment, 3.7 per cent during the first period and 5.4 per cent during the second period. In the English composition classes the loss through supervised study was marked during both periods of the experiment, being 3.8 per cent during the first and 6.1 during the second.

In sum, then, the facts of the present experiment indicate that supervised study of the type tested, when measured on the basis of average results for whole classes, was slightly less efficient in first-year algebra, was much less efficient in ninth-grade English composition, and was much more efficient in first-year Latin, than non-supervision.

These results are not construed as a condemnation of supervised study in algebra, or even in English composition. It remains to be determined what effectiveness supervised study will develop in these branches under other plans, or under the same general plan, when teachers have become more complete masters of the necessary technique. On the other hand, the writer believes that these results may well be interpreted as revealing: (1) a need for caution against a general assumption of the effectiveness of the divided- and double-period plans of supervised study; (2) a need for the development of special technique on the part of teachers supervising study.

Results in terms of the average improvement of poor and good groups.—Breslich's is the only previous experimental investigation in the field of secondary education that is informative regarding the relative improvement of bright and dull pupils under supervised study. "The poor pupils profited particularly by this method," wrote Breslich, but no special comment was made concerning the progress of good pupils. A casual inspection of the scores of the initial and final tests for the first period of his experiment leads one to suspect that the loss of the good pupils was quite as great in amount as the gain of the poor ones. The distribution of his scores is reproduced in Table XI. It will be noticed that the two classes, A and B, one being unsupervised, the other supervised, started in the experiment with about equal percentages of A's and B's, Class A having 25 per cent A's and 25 per cent B's, while Class B had 29.4 per cent A's and 23.5 per cent B's. In the final test the percentage of A's for the two classes was 7.1 and 0, respectively; of B's, 21.4 and 6.2, respectively, the supervised class showing the greater loss.

It is possible to get some notion of the ratio between the amount of gain of the poor and the amount of loss of the good students by a comparison of the credit points of these two groups, calculated from the percentage distribution of marks. Such a calculation is presented below. For this calculation two assumptions were made: (1) that the marks, A to F, inclusive, cover equal distances on the marking scale; (2) that the value of A is to the value of E as 2 to 1. The first assumption simply reflects one of the commonest requirements of a good scale; the second, a very conservative estimate of the degree of difference between the poorest and the best students in the classes, based on actual studies in educational measurement. The credit points based on these assumptions were: A, 4; B, 3.5; C, 3; D, 2.5; E, 2. Percentages representing the number of pupils obtaining each grade were converted into credit points for the better and poorer 50 per cent of the pupils in each class for both tests. It was found in a comparison of the credit points of the poor groups in the two classes that the poor group in the unsupervised class lost 16.2 more credit points than the poor group in the supervised class. When a similar comparison was made for the good groups in the two

TABLE XI

DISTRIBUTION OF SCORES IN BRESLICH'S EXPERIMENT

CLASSES	MARKS					AVERAGE SCORE
	A	B	C	D	F	
PRELIMINARY SCORES						
A Unsupervised....	25	25	37.5	12.5	0	81.4
B Supervised.......	29.4	23.5	23.5	17.7	5.9	79.4
SEMIFINAL SCORES						
A Unsupervised....	7.1	21.4	21.4	0	50	62.8
B Supervised.......	0	6.2	37.5	25	31.2	65.5

classes, it was found that the good group in the supervised class lost 19.75 more credit points than the good group in the unsupervised class. That is, according to this estimate, the good pupils sustained a loss through supervised study 1.2 times the amount of the gain of the poor pupils.

These results are consistent with the results presented in Table IX concerning gains and losses of good and poor groups in algebra. The poor groups in this subject gained, it will be recalled, but the good groups lost relatively more.

The experimental results available show conclusively, to the mind of the writer, that supervised study, in the form, and under the conditions tested, has retarded the progress of the better pupils and in general facilitated the progress of the poorer ones. From the standpoint, therefore, of the results obtained in a comparison of the progress under supervised study of the better and poorer halves of classes, the educational public should be warned of the possible loss in achievement of the better pupils through certain plans of supervised study. The general adoption of the divided-period plan, now probably the most widely used, cannot be urged for classes as wholes, without an improvement in technique that will lead to a demonstrable improvement in results. Until the divided-period plan meets the objections urged against it, some selective or differential plan of study-supervision should be recommended for secondary schools, and is so recommended by the writer.

A plan that selects the retardates and places them in special classes for study-supervision should improve on the present situation. This plan is already in operation in certain well-conducted secondary schools. Where supervised study is operated according to this plan, the better pupils are released from a method that demonstrably occasions loss in certain studies, and the poorer pupils work under a method which according to experimental results, promises gain for them

Later experiments with technique, accompanied by exact measurements of results, in various branches of study, should enable the schools to determine specifically in what subjects and by what plans study-supervision is profitable to each of the groups mentioned. Meanwhile segregation for purposes of study-supervision and differential treatment of the two groups in the course of the supervision seem to be the better policy.

SUMMARY

1. The method employed was experimental and comparative.

2. Satisfactory reports were obtained from 596 pupils in 34 classes, in 3 subjects and 14 high schools.

3. The test papers were scored both by the teachers of the classes and by competent paid laboratory scorers.

4. Three sets of averages were computed, one from the teacher's scores, another from the laboratory scores, and a third from the other two. The last, termed the combined score, was regarded as the most reliable basis of conclusions.

5. On the basis of combined averages for continuous groups it was found that:

   a) Ten supervised first-year algebra classes showed a relative loss of 0.1 per cent, compared with ten unsupervised classes.

   b) Three supervised classes in first-year Latin showed a relative gain of 10.3 per cent, compared with three unsupervised classes.

   c) Three supervised ninth-year English composition classes showed a relative loss of 2.9 per cent, compared with three unsupervised classes.

   d) Of fourteen algebra classes which continued through both periods of the experiment, seven supervised classes showed a relative loss of 0.2 per cent during the first period; the other seven, supervised during the second period, showed a relative loss of 5.3 per cent.

e) Of four Latin classes which continued through both periods of the experiment, two supervised classes showed a relative gain of 9 per cent during the first period; the other two, supervised during the second period, showed a relative gain of 7.1 per cent.

f) Of four English composition classes which continued through both periods of the experiment, two supervised classes showed a relative loss of 4.4 per cent during the first period; the other two, supervised during the second period, showed a relative loss of 3.9 per cent.

6. On the basis of combined averages for strictly comparable groups it was found that:

a) Ten supervised first-year algebra classes showed a relative loss of 1.2 per cent, compared with ten unsupervised classes.

b) Three supervised first-year Latin classes showed a relative gain of 7.5 per cent, compared with three unsupervised classes.

c) Three supervised ninth-grade English composition classes showed a relative loss of 2.7 per cent, compared with three unsupervised classes.

d) Of the fourteen algebra classes which continued through tho bperiods of the experiment, seven supervised classes showed a relative gain of 1 per cent during the first period; the other seven, supervised during the second period, showed a relative loss of 2.7 per cent.

e) Of the four Latin classes which continued through both periods of the experiment, two supervised classes showed a relative gain of 3.7 per cent during the first period; the other two, supervised during the second period, showed a relative gain of 5.4 per cent.

f) Of the four English classes which continued through both periods of the experiment, two supervised classes showed a relative loss of 3.8 per cent; the other two, supervised during the second period, showed a relative loss of 6.1 per cent.

7. From a study of the progress of poor and good pupils the method of strictly comparable groups, it was found that:

a) In six of ten pairs of poor groups in algebra supervised by study was superior.

b) The ten supervised poor groups in algebra showed an average improvement 0.93 per cent greater than the ten unsupervised poor groups.

c) In four of ten pairs of good groups in algebra supervised study was superior.

d) The ten supervised good groups in algebra showed an average improvement 4.5 per cent less than the ten unsupervised good groups.

e) Three supervised poor groups in Latin showed an average improvement 11.2 per cent greater than three unsupervised poor groups.

f) Three supervised good groups in Latin showed an average improvement 10.2 per cent less than three unsupervised good groups.

g) Three supervised poor groups in English showed an average improvement 1.8 per cent less than three unsupervised poor groups.

h) Three supervised good groups in English showed an average improvement 2.6 per cent less than three unsupervised good groups.

CONCLUSIONS

The preceding summary comprises the essential factual results of this investigation in so far as the methods employed and the care with which they were applied were able to reveal the facts. Making this summary statement of fact has been neither difficult nor dangerous. Quite different any attempt to interpret the meaning of the facts for the reader. But it is perhaps not so difficult or dangerous for the experimenter to make the attempt as it is for the casual reader, and if one does not venture an interpretation, the other is almost sure to. The writer, therefore, feels justified in expressing the following opinions which he believes the facts regarding the divided- and double-period plans of supervised study warrant:

1. On the basis of average results for whole classes, supervised study of the type tested was slightly less efficient in first-year algebra, was much less efficient in ninth-grade English composition, and was much more efficient in first-year Latin, than non-supervision.

2. Supervised study of the kind tested facilitated the progress of the poorer pupils, and to a correspondingly greater degree retarded the progress of the better pupils.

3. The divided- and double-period plans should not be urged for general adoption in secondary schools until their efficiency is more clearly demonstrated.

4. Until the divided- and double-period plans meet the objections urged against them, a selective or differential plan of study-supervision should be favored by secondary schools, that is, a plan which concentrates on the pupils of less ability.

5. The technique of supervising the study of the poorer pupils needs to be improved; a technique of supervising the study of the brighter pupils needs to be developed.